

F AD-A256 163

GE

Form Approved  
OMB No. 0704-0188

Public reporting burden  
gathering and maintaining  
collection of information  
Davis Highway, Suite 120  
U.S. Army Corps of Engineers  
Information Operations and Reports  
Attn: Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE C  
January 1992

## 4. TITLE AND SUBTITLE

Vegetative Management of Rivers, Harbors  
and Wetlands.

## 6. AUTHOR(S)

Edward O. Gangstad

## 7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

U.S. Army Corps of Engineers  
DAEN-CWO-R  
20 Massachusetts Ave. N.W.  
Washington, D.C. 20314-1000

## 3. REPORT TYPE AND DATES COVERED

Final Report 1988-1992

## 5. FUNDING NUMBERS

OCE-Natural  
Resources Manage-  
ment Branch  
*(12)*

## 9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

U.S. Army Corps of Engineers  
PIANC CECW-PK  
20 Massachusetts Ave. N.W.  
Washington, D.C. 20314-1000

8. PERFORMING ORGANIZATION  
REPORT NUMBER

OCE-NRM-92-1

## 11. SUPPLEMENTARY NOTES

Available from NTIC-FDAC  
Building #5 Cameron Station  
Alexandria, Virginia 22304-6145

## 12a. DISTRIBUTION/AVAILABILITY STATEMENT

Approved for public release;  
Distribution unlimited

10. SPONSORING/MONITORING  
AGENCY REPORT NUMBER

OCE-NRM-92-1

DTIC

ELECTE

SEP 29 1992

## 2b. DISTRIBUTION CODE

S  
A

## 13. ABSTRACT (Maximum 200 words)

## ABSTRACT

Prompted by the budgetary constraints and energy shortages of recent years, the Chief of Engineers has called for a more flexible and efficient approach to the operation of U.S. Army activities. The new program embraces the maintenance of an \$88 billion real property inventory, urgent minor construction, and operation of an extensive utilities systems. The program must be continually incorporated in the established functions of navigation and flood control to keep abreast of changes in technology.

DEFENSE TECHNICAL INFORMATION CENTER

92 0 28 085

401248



9226056

15px

GES

## 14. SUBJECT TERMS

Vegetative Management of,  
Rivers, Harbors and Wetlands

14 pages

17. SECURITY CLASSIFICATION  
OF REPORT

Unclassified

18. SECURITY CLASSIFICATION  
OF THIS PAGE

Unclassified

19. SECURITY CLASSIFICATION  
OF ABSTRACT

Unclassified

## 20. LIMITATION OF ABSTRACT

N/A

**VEGETATION MANAGEMENT OF RIVERS, HARBORS AND WETLANDS<sup>1/</sup>**

**by**

**Edward O. Gangstad**

**U.S. Army Corps of Engineers (Retired),**

**Washington, D.C.**

**ABSTRACT**

Prompted by the budgetary constraints and energy shortages of recent years, the Chief of Engineers has called for a more flexible and efficient approach to the operation of U.S. Army activities. The new program embraces the maintenance of an \$88 billion real property inventory, urgent minor construction, and operation of an extensive utilities systems. The program must be continually incorporated in the established functions of navigation and flood control to keep abreast of changes in technology.

**INTRODUCTION**

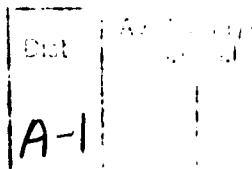
The U.S. Army Corps of Engineers dredges more than 350 million cubic yards of material annually in order to maintain authorized channel depths, and constructs many bank stabilization projects in its traditional role as the primary developer of the Nation's waterways. The engineer districts and divisions also operate a total of 255 locks at 219 main facilities and 172 dams for navigation purposes.

---

<sup>1/</sup>The findings in this report are not to be construed as an official Department of the Army position unless so designated by other authorized documents.

DTIC QUALITY INSPECTED 3

-1-



A new major link in the national waterways system -- the Tennessee-Tombigbee Waterway -- is under development. This 253-mile channel will connect two river basins and shorten the navigation distance from the Tennessee Basin to the Gulf of Mexico by over six hundred miles. Near Pickwick Landing, Tennessee, the north-flowing Tennessee River will join the south-flowing Warrior-Tombigbee system, thus more directly linking the inland waterways system with the southeastern Gulf and its ready availability to foreign markets.

#### **REGULATION PROGRAMS**

Since the passage of the 1889 Rivers and Harbors Act, the Corps has exercised a regulatory authority over the Nation's waterways. Basically, the Corps' responsibility under the 1889 law encompasses the general supervision of any activity which might interfere with navigation.

A real evolution in this authority began in 1968 when a precedent-setting court case was decided. In *Zabel v. Tabb*, the court ruled that the Corps must consider all "public interest" factors in issuing permits for dredge and fill operations. This was quickly followed by the National Environmental Policy Act of 1969, which directed the Corps to prepare environmental impact statements upon which to base decisions affecting wetlands.

Then in 1972, Congress enacted amendments to the Federal Water Pollution Control Act. Section 404 of the amended Act provided for Federal jurisdiction over discharge of dredge and

fill materials into navigable waters. The Corps issued its first regulations for implementing Section 404 in April 1974, and initially limited the regulatory authority to waters which were considered navigable and below the mean high water line. But this interpretation was successfully challenged in court, and on 27 March 1975, the U.S. District Court for the District of Columbia directed the Corps to extend its regulatory responsibility to all waters of the United States, including those above the mean high water line. This far-reaching decision established the Corps' three-phase program. The Corps will administer the total regulatory program, with Section 404 authority being exercised over all waters of the United States up to headwater streams having an average flow of five cubic feet per second or greater.

Having worked so long on our Nation's coastal and water areas, the Corps is well aware of the intrinsic value of our estuaries and wetlands and is committed to preserving this national asset. When the United States was first settled, there were about 127 million acres of wetlands, but by 1955 only 75 million acres remained. Between 1950 and 1969, 200,000 acres of wetlands in Florida, California, and New York were converted to general public and private use.

#### **RECREATION-RESOURCE MANAGEMENT**

The Corps' involvement in recreation-resource and wildlife management adheres to basic environmental policies outlined by

the National Environmental Policy Act of 1969. This law requires the assessment of a water resources project's possible environmental effects during the planning stage and the preparation of an Environmental Impact Statement, to be submitted to the Council on Environmental Quality, for every proposed or ongoing major Federal action, including Corps project construction, maintenance, and major regulatory actions. The Impact Statement, prepared by Corps biologists and engineers, details the species of animals, fish, and plants found in the area to be affected and predicts how their habitat, growth, and food chain might be altered by the proposed action.

This emphasis on the development of ecologically sound alternatives to flood control and navigation problems has led to Corps-sponsored research in the environmental field and the implementation of measures designed to protect fish and wildlife on Corps-administered lands. In addition to Corps-owned lands set aside for recreation, more than a third of a million than 200 outgrants totaling 2 million acres have been made to State fish and wildlife agencies.

In the Pacific Northwest, Corps seek to curtail losses of salmon and other fish while constructing and operating flood control projects and hydroelectric power plants along the Columbia and Snake Rivers. Bonneville Dam in the State of Washington has been modified to include two fish ladders, a fish collection system at the powerhouse, fish locks, and provision

for the downstream passage of salmon fingerlings. The protection of the region's fishes is not, however, limited to a single project; it is a region-wide priority. At Dworshak Dam and Reservoir in Idaho, the temperature and timing of releases from the powerhouse has been altered to sustain and protect downstream fisheries. Meticulous studies are pursued and technological innovations adapted as part of multi-purpose projects in an attempt to mitigate adverse environmental effects, while answering the region's need for a navigable waterway and for a reliable power supply.

#### **REGULATORY PROGRAM OF LAND USE**

Since the passage of the 1899 Rivers and Harbors Act, the U.S. Army Corps of Engineers has exercised a regulatory authority over the Nation's waterways. Under the 1899 law, the U.S. Army Corps of Engineers has the general supervision of any activity which might interfere with navigation. The National Environmental Policy Act of 1969, directed the Corps to prepare environmental impact statements upon which to base decisions affecting wetlands. In 1972, amendments of the Water Pollution Control Act, section 404, provided for Federal jurisdiction over the discharge of dredge and fill materials into navigable waters. Having worked so long on our Nations coastal and water areas, the Corps is well aware of the intrinsic value of our estuaries and wetlands and is committed to preserving this national asset.

### **Field guides**

These manuals (8,9) were written as a guide for Corps of Engineers field inspectors involved in the Federal Regulatory Functions' mission. They were prepared in non-technical language so that individuals of limited biological background could use them as a field reference for the identification of wet land plants and their role in the ecological community.

Because of the great diversity of aquatic flora, and a desire to provide field personnel with a needed reference work in a timely fashion, all wetland species are not covered. The same plant if grown in two different areas, is related to the physical and chemical nature of the soil and water in which the plant is growing as well as the climatic conditions of the area. Some plants are able to adapt to a wide range of conditions, others are more limited. Although many of the species found in this manual may be able to survive in non-marsh areas, it is probable that other non-marsh species will be more adapted to the upland environment and therefore outcompete the wetland plants.

The areas which will present the most problems in determining the extent of our jurisdiction are the transition zones between wetland and upland. These zones (known as ecotones) usually consist of a mixture of both wetland and upland species, as well as some species characteristics of the intermediate moisture conditions.

From an ecological view point, these areas are extremely important. Oftentimes the diversity of animals associated with ecotones is much greater than the number of species found in either the marshland or the upland. In addition, they serve as buffer zones which lessen the detrimental effects of many natural and man-made stresses. Because of its integral relationship, the ecotone can be considered an extension of the wetland.

Wetlands in the Gulf Coast area include saline, brackish, intermediate, and fresh water marshes; swamps; willow thickets; and bottomlands. The common and scientific name and habitat are included for assistance. The plant species have been arranged to the extent possible according to habitat type or to similar species for comparison. The identification of a wetland plant indicator in an area does not automatically classify the area as a wetland. Wetlands are those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation adapted for life in saturated soil conditions. For an area to satisfy the criteria for being a wetland, the prevalence of plants by species and/or numbers should therefore consist of wetland indicator species.

It should be injected at this point that the same species of plant may be found in different habitats just as baldcypress may be found in fresh marshes, swamps, and bottomlands, and wiregrass may be found in the four types of marshes. The same plant

species found in different habitats may exhibit different characteristics. A difference in elevation of several inches in the coastal areas is often reflected by a difference in the plant species. Although some wetland species may be found in nonwetland areas, it is expected that upland plants would successfully compete against these and the prevalence of upland species would dictate that the area in question be classified as a nonwetland.

#### **1985 FOOD SECURITY ACT PROGRAMS<sup>1/</sup>**

Several major conservation programs were established by the U.S. Congress with the 1985 Food Security Act. Major provisions included the Conservation Reserve Program (CRP), Sodbuster, Swampbuster, Conservation Compliance, and the Acreage Reduction Program (ARP). Together, these programs have a goal of reducing crop production in the United States, particularly on soils classified as highly erodible. To date, these conservation and production adjustment programs have targeted some 170 million acres of land.

#### **Acreage Reduction Program**

The ARP with 20 to 30 million acres has been considered as short-term acreage reduction. The amount of land and specific areas utilized by farmers in ARP varies per annual guidelines. Land may be out of production one to several years and is subject to certain management criteria.

---

<sup>1/</sup>Abstracted from, Ecological Impacts of Federal Conservation and Cropland reduction programs, CAST, 1990, with permission.

### **Conservation Reserve Program**

The CRP is the newest of the long-term acreage reduction programs with a goal of enrolling 40 to 45 million acres. The primary goal of the CRP is to reduce water and wind erosion on the nation's most highly erodible and fragile croplands (U.S. Congress, 1985).

The CRP is a voluntary program that places qualifying land into permanent, soil-conserving covers such as grass and trees for a ten-year contract period (payment per acre on a bid basis). Farmers in the program must maintain the conservation cover at their own expense and may not use the land for commercial purposes. However, leasing the land for hunting, fishing, and some other recreational uses is permitted. Under emergency conditions such as drought, some provisions may be made for use of forages for livestock. Changes were made in the program in 1988 to encourage the enrollment of filter (buffer) strips along streams and other waterways and to promote additional tree planting.

Almost two-thirds (21.7 million acres) of the cropland contracted in the CRP were farm base acres. Planting these lands into grasses or trees reduced erosion from an average of 20.9 tons of soil per acre per year to 1.6 tons (U.S. Department of Agriculture, ASCS, 1990). If CRP reached its targeted level of 40 to 45 million acres, it would remove over 10% of the nation's cropland from production and should reduce overall soil erosion by 850 million tons of soil per year.

Farmers began in March 1986 to submit bids for CRP enrollment. Over 33.9 million acres were under contract as of January 1990. Participation has been especially strong in the Great Plains states.

### **Sodbuster**

Sodbuster provisions of the 1985 FSA apply to highly erodible land not used to produce annual crops during the period 1981 to 1985. Producers who farm this land are denied most farm program benefits unless they have an approved conservation plan. Sodbuster applies to 502 million acres, most of which is currently in native range and forest. About 227 million acres are considered to have potential for conversion to cropland.

Basically, sodbuster is intended to discourage farmers from bringing still more land into crop production, like that currently being enrolled in the CRP. In some instances, farmers may have sodbusted in the past to expand their bases for program crops. In the past, federal government crop insurance, disaster payments, and credit have been favored in high risk areas.

### **Swampbuster**

The swampbuster provisions of the FSA are designed to discourage additional conversion of naturally occurring wetlands to production of agricultural commodities. As in the case of sodbuster, the disincentive is the loss of federal farm program benefits. However, unlike sodbuster, those who swampbust cannot

maintain eligibility for programs by implementing any type of plan. The Tax Reform Act of 1986 also terminated important tax advantages related to wetland conversions.

In 1982, the United States had about 90 million acres of wetland which was about one-half as much as existed at the time of earliest European settlement of the United States. Agriculture has been the reason for the loss of most wetlands, and states like Illinois, Iowa, Missouri, and Nebraska have lost more than 90% of their original wetlands. Between the mid-1950s and 1970s alone, 12 million wetland acres were converted to agricultural uses.

Of the remaining 90 million acres of wetlands, 65.3 million acres are privately owned and are subject to the swampbuster provisions. As a practical matter, most of the easiest wetland conversions have already been completed, leaving only 5.2 million acres that are considered to have a medium or greater potential for conversion.

#### **Conservation Compliance**

The conservation compliance provisions of the FSA apply to highly erodible soils on which annual crops were grown at least once during the years 1981 to 1985. To remain eligible for most U.S. Department of Agriculture farm program benefits, farmers must develop and have a locally approved conservation plan for their farms by January 1, 1990. These plans are to be fully implemented by January 1, 1995.

The U.S. Department of Agriculture estimates that 118 million acres of cropland are subject to conservation compliance. Farmers are already applying basic conservation practices adequate to meet compliance standards on 35 million of these acres, while over 33.9 million of these acres subject to compliance have been entered in the CRP program.

#### **SUMMARY AND CONCLUSIONS**

Today's civil engineers face a demanding, challenging future, one which requires flexibility to meet changing national priorities, particularly in the areas of environmental development, and the programs which have been established to preserve wetlands as they are a part of the natural environment.

## **REFERENCES**

1. Armstrong, E.L. **History of Public Works in the United States 1776-1976.** Meetings of the American Public Works Association. Chicago, Ill.
2. Barbarika Jr., A. and Dicks, M.R. 1988. Estimating the cost of conservation compliance. **J. Ag. Econ. Res.** 40:12-20.
3. Erickson, M.H., and Collins, R. 1985. Effectiveness of acreage reduction programs. Pp. 166-183. **Agricultural-food policy review: Commodity program perspectives.** Agricultural Economic Report No. 530. U.S. Department of Agriculture, Economic Research Service, Washington, D.C.
4. Gangstad, E.O. 1988. **Recreation Resource Management.** Thomson Publications, Fresno, CA.
5. Gangstad, E.O. 1990. **Natural Resource Management of Water and Land.** Van Nostrand Reinhold, New York, NY.
6. U.S. Army Corps of Engineers. 1976. **Flood Control in the Lower Mississippi Valley.** Vicksburg, Miss.
7. U.S. Army Corps of Engineers. 1986. **Management of Natural Resources and Outdoor Recreation at Civil Works Waters Resource Projects.** ER 1130-2-400. Washington, D.C.

8. U.S. Army Corps of Engineers. 1977. Wetland Plants of the Eastern United States, NADP 200-1-1. North Atlantic Division, New York, New York.
9. U.S. Army Corps of Engineers. 1977. Wetland Plants of the New Orleans District. New Orleans, Louisiana.